

JJG

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Verification Regulation of Calibration Instrument for Torque Wrenches

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1 Scope

This Regulation applies to the initial verification, subsequent verification and usage inspection of electronic, mechanical and hydraulic calibration instrument for torque wrenches (hereinafter referred to as torque instrument).

2.1 Standard torque wrench

The torque wrench which has high accuracy and is used to conduct quantity-value transfer for calibration instrument for torque wrenches.

2.2 Average arm length

The average length of torque wrench's arm, within a certain range.

2.3 Minimum arm length

The minimum length of torque wrench's arm, within a certain range.

3 General introduction

Torque instruments are the instruments used to verify (calibrate) various types of manual torque wrenches. Torque instruments can be generally divided into mechanical, hydraulic and electronic types (it usually uses strain torque sensor) according to the working principle. It mainly includes two kinds according to the structure. one is the calibration instrument for torque wrench with a loading structure, another one is the calibration instrument for torque wrench without a loading structure.

Mechanical and hydraulic torque instruments coaxially concatenate the wrench of torque wrench to be verified AND the torsion elastomer of torque instrument.

When imposing torque directly or indirectly on the tail section of torque wrench, specifications and user's requirements.

5.3.2 Torque sensor and indication instrument shall support the use of each

other. Generally, they shall not be replaced randomly. If they need to be replaced, the re-verification is needed.

5.4.1.1 Scale and mark of each indication dial shall be clear, explicit and easy

to read. The zero and maximum value of each scale shall be explicitly marked.

5.4.1.2 It shall have reset mechanism to indicate zero and holding mechanism of torque's indication value.

5.4.1.3 The engraved lines on the dial shall be uniform, the width of pointer shall be approximately equal to the width of engraved lines. The resolution shall be determined according to the RATIO of the width of pointer AND the spacing (scale spacing) between the centers of 2 adjacent engraved lines. The recommended ratio is 1/2, 1/5 and 1/10. When the scale spacing is not less than 1.25mm, 1/10 dial scale value may be estimated

and read.

5.4.1.4 During the process of imposing torque, the pointer shall be smooth, and have no abnormal phenomenon such as impact and stagnation. Active pointer and passive pointer shall be coincide with the engraved lines of the dial, and be parallel to the surface of dial.

5.4.1.5 The friction of active pointer shall be able to make passive pointer stay in any position. When conducting verification with or without passive pointer, its relative error of indication value shall not exceed the relative error of indication value as specified by the corresponding accuracy grade. When the torque of fixed-value type torque wrench is suddenly removed, the amount of change of active pointer shall not be greater than 1/5 of the relative error of maximum torque indication value of the corresponding accuracy grade.

5.4.2 Digital instrument

5.4.2.1

The connection between torque sensor and indication device shall be reliable. And it shall have certain ability to resist to electromagnetic interference.

5.4.2.2

Each operation switch, button, knob and jack shall have words or symbols marked on it, and the operation shall be flexible and reliable.

5.4.2.3

The indication of figures shall be clear and accurate. And it shall have functions of continuation, peak holding and zero-adjustment.

5.4.2.4

The minimum figure increment shall be 1×10^n , 2×10^n or 5×10^n , in which n is a positive integer, a negative integer or zero. Each grade shall includes zero and maximum value of its scale range. And it shall indicate the declining symbols of less-than zero position (for example, displayed by the symbol "+" or "-").

5.4.2.5

For those with function of digital signal output, the output data shall be consistent with the indication value.

5.4.2.6 When torque instrument is without loading, if the indication value

change is not greater than 1 increment, then the resolution is 1 increment of the last significant figure displayed; if the indication value change is greater than one increment, then the resolution is the half of range of the indication value change.

6 Measurement instrument control

Measurement instrument control includes. the initial verification, subsequent verification and inspection when in use.

6.1.1 Environmental condition

According to the specification of torque instrument grade, verification of 0.3 grade and 0.5 grade shall be at room temperature of $(20 \pm 5) ^\circ\text{C}$, verification of 1.0 grade and 2.0 grade shall be at room temperature of $(20 \pm 10) ^\circ\text{C}$, and under the condition of a relative humidity not greater...